

I Claim:

1. An arbitrator for reordering access requests to a memory system to reduce memory system conflicts, said arbitrator comprises:

5 a transaction buffer for buffering said access requests;
an output counter for counting access requests issued by said arbitrator;
a mapping table for mapping at least said output counter to said access requests in said transaction buffer; and
a reordering unit for dynamically re-ordering entries in said mapping table
10 such that said mapping points to said access requests in an issue order wherein memory system conflicts are reduced.

2. The arbitrator as claimed in claim 1, wherein said reordering unit comprises:

15 a conflict detector circuit for detecting memory system conflicts between one or more issued access requests and said access requests in said transaction buffer;
a selection unit for selecting a next conflict-free access request in input order; and
20 a mapping table update circuit for re-ordering said entries in said mapping table based on said next conflict-free access request in input order.

3. The arbitrator as claimed in claim 2, wherein said arbitrator further comprises:

25 a queue position register for recording said input order.

4. The arbitrator as claimed in claim 3, wherein said arbitrator further comprises:

an input counter for counting access requests received by said arbitrator,
30 wherein said mapping table maps said input counter to the entry in said transaction buffer that is to be filled by a next received access request.

5. The arbitrator as claimed in claim 1, wherein said mapping table is a hash table.

6. An arbitration method of reordering access requests to a memory system to
5 reduce memory system conflicts, said method comprising:

- (a) buffering said access requests in a transaction buffer;
- (b) maintaining a mapping table, said mapping table mapping at least an output counter to said access requests in said transaction buffer; and
- (c) dynamically re-ordering entries in said mapping table such that said 10 mapping points to said access requests in an issue order wherein memory system conflicts are reduced.

7. The method as claimed in claim 6, wherein step (c) comprises the sub-steps of:

- 15 (c1) detecting memory system conflicts between one or more issued access requests and said access requests in said transaction buffer;
- (c2) selecting a next conflict-free access request in input order; and
- (c3) re-ordering said entries in said mapping table based on said next conflict-free access request in input order.

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8. The method as claimed in claim 7, wherein said method comprises the further steps of:

- (d) maintaining a queue position register, said queue position register recording said input order.

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9. The method as claimed in claim 8, wherein, upon receiving a next access request, said method comprises the further steps of:

- (e) counting access requests received by said arbitrator;
- (f) substituting a next received access request in said transaction 30 buffer at a buffer location pointed to by a mapping through said mapping table by said number of access requests received by said arbitrator.

10. The arbitration method as claimed in claim 6, wherein said mapping table is a hash table.